duodenal ulcer with "pedatrophie." Finklestein,[13] who so far as we know is the only author of a text-book of pediatrics who has given the subject any consideration, considers the tendency to ulceration to have its origin in the processes of decomposition.[14] It is on the other hand as easy to defend the view that the decomposition is a result rather than a cause of duodenal ulcer, and hence that duodenal ulcer is one of the many causes of chronic nutritional disease, or that both are dependent upon the same causes. The cases of duodenal ulcer in the newborn and the few cases of ulcer in infants without chronic nutritional disorders would point toward these latter conceptions. Whether the relationship of the nutritional disorder to the duodenal ulcer is one of cause or result the association of the two is one of the most striking features of the pathology and is a factor of importance in the diagnosis, prognosis, and treatment.

EFFECTS OF HEREDITY IN BOVINE TUBERCULOSIS.[1]

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That a very high percentage of dairy cattle are tuberculous, that is, are "reactors" is a universally admitted fact. State and municipal laws are more and more insisting that the milk of tuberculous animals shall not be sold, and the question of bovine tuberculosis has become a serious economic as well as hygienic problem. When one realizes that for general use milk must be furnished at a rate which can be paid by the average citizen and at the same time appreciates the fact that the dairyman must expect from 15 to 50 per cent. of his stock to be ruled out if the tuberculin tests are rigidly enforced, the problem of milk supply becomes a factor of very great difficulty as well as importance. A further fact of great bearing is the strong probability that the more highly blooded cattle are most likely to be found to be reactors. This makes the problem of the honest and ambitious dairyman even more difficult, for if he attempt to increase the quality of milk or the butter production of his herd, he almost invariably breeds in tuberculous stock, and unless extraordinary and expensive methods of isolation are practised dissemination of the infection is almost certain to follow. On the other hand,'if he fails to thus improve his stock he is very likely to get into trouble because the quality of his milk may be found deficient and he thus also lays himself liable to prosecution.

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[13] Lehrbuch der Sauglingskrankheiten, Zweite Halfte, p. 206.

[14] In nicht allzu seltenen Fällen kommt es zu teerfarbenen Entleerungen als Symptom von Darmblutungen. Sie stammen aus peptischen Duodenalgeschwüren, die sich nach neuen Feststellungen bei dekomponierten Kindern so haufigfinden dass der Dekompositions vorgang in irgendeiner bisher noch dunklen Weise die Disposition dazu begründen muss.

[1] Read before the Association of American Physicians, May 13, 1914.

The difficulty of improving breed is a very serious matter, particularly for the farmer of small capital since the price of blooded stock is always high and he is very likely to purchase as non-reactors cattle which have been "plugged" against the tuberculin reaction by dishonest dealers. This trick of "plugging," though familiar to most stock men, I find is not widely known by physicians. There is no doubt but that when tuberculin tests are known to be about to be made, this method is practised so that negative results are obtained even in cattle which may be extensively so diseased. "Plugging" is performed by injecting a dose of tuberculin a few days before the public or legal test. For some time after the reaction which follows this injection, subsequent tuberculin tests are negative so that even widely diseased animals may be tested and sold apparently as free from tuberculosis. As can be seen, detection of this fraud may be practically impossible.

Another point often unrecognized by the hygienist is that the tuberculin test in cattle as in man is positive in animals which while they may harbor foci of the disease are not actively tuberculous, that is, the reaction may be given by cured cases. If we were to apply to man routine tuberculin tests it is certain that we should find many supposed and actually healthy individuals who would respond to the reaction. The term "Reactor" is therefore indiscriminatively applied by stock men to animals perhaps not actively or obviously tuberculous and yet which simply give the reaction. It is found, however, that when such stock, apparently otherwise sound, be housed and fed with perfectly healthy non-reactors the non-infected herd sooner or later become widely diseased for the sensitiveness of uninfected animals to tuberculosis is remarkable and apparently much greater than in man. The common practice of dairy men is to largely ignore this fact, to take the chance as part of the risks of the business, and to eliminate only such animals as are obviously sick. These usually form but a small percentage of the real reactor group and under such methods the disease can never be eliminated from the herd.

The problem then becomes very complex particularly from an economic standpoint. It is true that thorough pasteurization of milk will eliminate the possibility of transmitting tuberculous infection to man. I do not propose to enter into the discussion of this problem at this time but to especially point out that reactors in any herd eventually cause the more or less complete infection of that group.

The experiments conducted at Woodcrest, previously reported,[2] have apparently furnished a solution for this problem though it must be admitted a very expensive one indeed for the breeder of moderate capital since it practically necessitates separate and distinct establishments and personnel, and enough capital to permit a more or less idle and largely non-productive group of animals.

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[2] Trans. Soc. Exp. Med.[and Biol., 1914, vol. xi, No. 2, p. 50.

To me personally the fact of greatest interest has been that the inbreeding of tuberculous animals has in no way impaired the type or desirability of the offspring. It has been conclusively shown that the calves are very rarely, if ever, infected before or at birth. That the slightest carelessness in exposure of the newborn calves to infection leads to certain disaster is illustrated by ten recent infections at Woodcrest through the negligence of one workman in not minutely following out the instructions laid down. Tuberculous animals of desirable types may therefore be freely used for breeding purposes provided that the calves are not allowed to come in contact with the infected parents. The economic as well as the biological importance of this apparent fact is obvious.

To establish the fact that reactors may furnish and perpetuate most desirable traits as to type, fertility, milk, and cream production, and to therefore contravert the suggestion that such infected animals should be utterly destroyed, notes of the following group of animals are presented, taken by permission of Mr. Dimick from the records of Woodcrest Farm.

Pietje 22d, No. 70884. The foundation dam of this strain was imported from Holland by the Woodcrest Farm. She was supposedly of the highest type representing the Holstein-Fresian breed and her pedigree shows descent from the finest animals of this stock. It has not been possible to ascertain whether or not she was derived from tuberculous parentage but early tests at the Woodcrest Farm showed her to be a "reactor" although apparently in perfect health. She died of generalized tuberculosis at the age of fourteen years, four months. She is credited with four calves born in Holland and seven in this country. She made the following remarkable record:

Butter, seven-day test	31.62 pounds
Milk, seven-day test	673.90 "
Butter, thirty-days test	128.37 "
Milk, thirty-days test	2786.40 "
Butter, six-months test	566.60 "

This last item is stated to be the world's record for butter production for this time. During this same period she produced 13,673.90 pounds of milk. While at the Woodcrest Farm she gave birth to an annual calf with records as follows:

(1) Woodcrest Pietje. A bull calf; a perfect and effectively fertile specimen, sold as a herd bull. This animal is not known to be tuberculous, although it is strongly probable that he is.

(2) Pietje 22d's Woodcrest Lad. This animal is a perfect specimen in every respect and has been retained at the head of the Bou-

tekou Farm as a stud animal. He is known to be tuberculous and is isolated with the tuberculous herd. A daughter of this animal has produced at the age of four years 35 pounds of butter in seven days. This is stated to be a world's record for this age.

(3) Pietje 22d's daughter. This animal at birth was a perfect specimen in every apparent respect, although she was found to be tuberculous in the second year of her age. Her record is as follows:

Butter, seven days	25.19 pounds
Milk, seven days	553.40 "
Butter, thirty days	101.29 "
Milk, thirty days	2202.22 "

She was fertile each year and her offspring have all been perfect specimens of their kind. She died in January last from a generalized tuberculosis one week after the delivery of her last and perfect calf. This animal has not yet been submitted to the tuberculin test but inasmuch as it was removed from the mother immediately after birth, from previous experience, it is assumed to be non-tuberculous. She was the dam of Woodcrest Jamaica Pietje; a bull calf, perfect in every respect and now the head of a valuable herd. This animal has proved to be normally fertile. A daughter in her second year has given a butter record for seven days of 16.07 pounds, and of milk for the same time of 350.30 pounds. Woodcrest Jamaica Pietje was removed from the dam at birth, isolated from the tuberculous herd, and is free from any disease. Also dam of Woodcrest Johanna Pietje: A perfect and fertile bull. He is free from tuberculosis as he was removed from the dam immediately after birth. Dam also of Woodcrest Pietje Pontiac: A perfect male specimen removed from the dam immediately after birth and consequently free from disease. This animal was sold while a calf for $2000, and is the anticipated head of a valuable herd.

(4) Pietje 22d's second daughter. This animal has always been tuberculous having received the infection apparently from her dam shortly after birth, nonetheless she was in every way a perfect specimen and gave a record of butter production for seven days of 29.63 pounds; of milk in the same period 584.70 pounds. Butter thirty days, 117.24 pounds; butter for one year, 829.53 pounds. Milk for the same time, 19,722.90 pounds. This animal died apparently from a generalized tuberculosis in September, 1913. She had been fertile each year since her maturity and all her calves were normal specimens. Three of these offsping are recorded all perfect, typical, and fertile in every way.

(5) Pietje 22d's son. This animal is a perfect specimen, although found to be tuberculous at the age of one year. He is at the head of a herd, serving about 100 animals yearly; is very fertile and typical of the breed in every way. His first five daughters at two years of age average over 18 pounds of butter in seven days each and over 4 per cent. of fat.

(6) Pietje 22d's third daughter. Found to be tuberculous at three years of age; after having successfully passed two prior tests. Her record shows butter production in seven days, 16.07 pounds; milk production seven days, 302.30 pounds. This animal is the dam of one heifer which has not yet freshened but which is a perfect specimen of her class.

(7) A bull calf, the last offspring of this remarkable cow, died of an infantile diarrhea in its very early youth, before it had been registered.

The male parentage in many if not most of these instances has been also tuberculous in all probability. The question of whether or not the offspring became tuberculous depends entirely upon exposure after birth. The point of greatest importance illustrated by this remarkable family is that no defects of a biological nature have been found in any of the offspring of this definitely tuberculous stem. All are perfect specimens. There has been no reduction in fertility, and judging from the milk and butter records no diminution in butter or milk production, and as stated, several world's records have been attained by these animals.

This family is apparently fairly illustrative of others of like nature, and in so far as the observations go it seems definitely demonstrated that parental tuberculosis in the cow causes no defects to be apparent in the offspring even though the calf be born in the almost terminal stages of the disease in the dam.

This report is also intended to point out that the term "reactor" as used by stock men often means what in human medicine would be classed as healed tuberculosis. It seems to show that definitely tuberculous animals may be safely utilized for breeding purposes and that they may be crossed and inbred with entire disregard of the factor of tuberculosis and purely for the purpose of improving or maintaining type. Most important of all, the fact stands out that although it may not be wise to utilize the unpasteurized milk of reactors for human consumption nor yet for the feeding of calves or other animals, yet reactors may be successfully and safely used as brood stock and thus cease to be an economic waste.

NOTES ON THE EXAMINATION OF THE URINE FOR TUBERCLE BACILLI.

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The well-known difficulties attending the accurate diagnosis of tuberculosis of the kidney and bladder make it important to use every possible device to increase the probability of finding the